RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B00-068 H1127
RFW# : 0011L175

W.O. # : 10985-001-001-9999-00
Date Received: 11-07-00

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

2. The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.

3. Sample holding times as required by the method and/or contract were met.

4. The cooler temperature was recorded on the chain-of-custody.

5. The method blanks were within method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits.

7. The matrix spike recoveries were within the 75-125% control limits.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for solid samples are reported on a dry weight basis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

12-20-00
Date

njp\il1-175

02

H1127

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B00-068 H1127

DATE RECEIVED: 11/07/00 RFW LOT # :0011L175

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B10F88						
% SOLIDS	001	S	00L%S177	11/01/00	11/08/00	11/09/00
% SOLIDS	001 REP	S	00L%S177	11/01/00	11/08/00	11/09/00
NITRATE BY IC	001	S	00LXC076	11/01/00	11/29/00	11/29/00
NITRATE BY IC	001 REP	S	00LXC076	11/01/00	11/29/00	11/29/00
NITRATE BY IC	001 MS	S	00LXC076	11/01/00	11/29/00	11/29/00
TOTAL CYANIDE	001	S	00LC110	11/01/00	11/13/00	11/13/00
PH	001	S	00LPH094	11/01/00	11/08/00	11/08/00
SULFIDE	001	S	00LSDA52	11/01/00	11/10/00	11/10/00
B10F89						
% SOLIDS	002	S	00L%S177	11/01/00	11/08/00	11/09/00
NITRATE BY IC	002	S	00LXC076	11/01/00	11/29/00	11/29/00
TOTAL CYANIDE	002	S	00LC110	11/01/00	11/13/00	11/13/00
TOTAL CYANIDE	002 REP	S	00LC110	11/01/00	11/13/00	11/13/00
TOTAL CYANIDE	002 MS	S	00LC110	11/01/00	11/13/00	11/13/00
PH	002	S	00LPH094	11/01/00	11/08/00	11/08/00
PH	002 REP	S	00LPH094	11/01/00	11/08/00	11/08/00
SULFIDE	002	S	00LSDA52	11/01/00	11/10/00	11/10/00
SULFIDE	002 REP	S	00LSDA52	11/01/00	11/10/00	11/10/00
SULFIDE	002 MS	S	00LSDA52	11/01/00	11/10/00	11/10/00
LAB QC:						
NITRATE BY IC	MB1	S	00LXC076	N/A	11/29/00	11/29/00
NITRATE BY IC	MB1 BS	S	00LXC076	N/A	11/29/00	11/29/00
TOTAL CYANIDE	LCS L	S	00LC110	N/A	11/13/00	11/13/00
TOTAL CYANIDE	LCS L	S	00LC110	N/A	11/13/00	11/13/00
TOTAL CYANIDE	MB1	S	00LC110	N/A	11/13/00	11/13/00
SULFIDE	MB1	S	00LSDA52	N/A	11/10/00	11/10/00
SULFIDE	MB1 BS	S	00LSDA52	N/A	11/10/00	11/10/00

Recra LabNet Philadelphia

WET CHEMISTRY
METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	ASTM	SW846	OTHER
% Ash	__ D2216-80		
% Moisture	__ D2216-80		__ ILMO4.0 (e)
% Solids	✓ D2216-80		__ ILMO4.0 (e)
% Volatile Solids	__ D2216-80		
ASTM Extraction in Water	__ D3987-81/85		
BTU	__ D240-87		
CEC		__ 9081	__ c
Chromium VI		__ 3060A/7196A	
Corrosivity __ by coupon __ by pH		__ 1110(mod) __ 9045C	
Cyanide, Total		✓ 9010B/9014	__ ILMO4.0 (e)
Cyanide, Reactive		__ Section 7.3/9014	
Halides, Extractable Organic		__ 9020B	__ EPA 600/4/84-008
Halides, Total		__ 9020B	__ EPA 600/4/84-008
EP Toxicity		__ 1310A	
Flash Point		__ 1010	
Ignitability		__ 1010	
Oil & Grease		__ 9071A	
Carbon, Total Organic		__ 9060	__ Lloyd Kahn (mod)
Oxygen Bomb Prep for Anions	__ D240-87(mod)	__ 5050	
Petroleum Hydrocarbons, Total Recoverable		__ 9071	__ EPA 418.1
pH, Soil		✓ 9045C	
Sulfide, Reactive		__ Section 7.3/9030B	
Sulfide		✓ 9030B(mod)	
Specific Gravity	__ D1429-76C/	__ D5057-90	
Sulfur, Total		__ 9056	
Synthetic Preparation Leach		__ 1312	
Paint Filter		9095A	

Other: Nitrate **Method:** EPA 300.0 (mod)

Other: **Method**

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METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LC = Laboratory Control Sample.
NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.

2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).

3. Test Methods for Evaluating Solid Waste (USEPA SW-846).

a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).

b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).

c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).

d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).

e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.

f. Code of Federal Regulations.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/04/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B10F88	% Solids	89.6		%	0.01	1.0
		Nitrate by IC	1.4	u	MG/KG	1.4	1.0
		Cyanide, Total	0.49	u	MG/KG	0.49	1.0
		pH	9.3		SOIL PH	0.01	1.0
		Sulfide	42.0	u	MG/KG	42.0	1.0
-002	B10F89	% Solids	74.9		%	0.01	1.0
		Nitrate by IC	1.7	u	MG/KG	1.7	1.0
		Cyanide, Total	0.63	u	MG/KG	0.63	1.0
		pH	9.0		SOIL PH	0.01	1.0
		Sulfide	51.0	u	MG/KG	51.0	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/04/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	00LXC076-MB1	Nitrate by IC	1.2 u	MG/KG	1.2	1.0
BLANK1	00LC110-MB1	Cyanide, Total	0.50 u	MG/KG	0.50	1.0
BLANK10	00LSDA52-MB1	Sulfide	40.0 u	MG/KG	40.0	1.0

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INORGANICS ACCURACY REPORT 12/04/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B10F88	Nitrate by IC	27	1.4 u	28	97.3	1.0
-002	B10F89	Cyanide, Total	5.8	0.63u	5.8	99.3	1.0
		Sulfide	478	15.3	518	89.4	1.0
BLANK10	00LXC076-MB1	Nitrate by IC	25	1.2 u	25	98.5	1.0
BLANK10	00LSDA52-MB1	Sulfide	377	40.0 u	421	89.5	1.0

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INORGANICS PRECISION REPORT 12/04/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B10F88	% Solids	89.6	90.3	0.77	1.0
		Nitrate by IC	1.4 u	1.4 u	NC	1.0
-002REP	B10F89	Cyanide, Total	0.63u	0.63u	NC	1.0
		pH	9.0	9.2	1.9	1.0
		Sulfide	51.0 u	46.8 u	NC	1.0

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INORGANICS LABORATORY CONTROL STANDARDS REPORT 12/04/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCSS1	00LC110-LCS1	Cyanide, Total LCS	9.9	10	MG/KG	98.8
LCSS2	00LC110-LCS2	Cyanide, Total LCS	5.0	5.0	MG/KG	99.9

RECRA LabNet Use Only

0011L175

Custody Transfer Record/Lab Work Request

RECRA LabNet

ALL

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU-Hanford B00-008

Est. Final Proj. Sampling Date:

Project #: 10985-001-001-9999.00

Project Contact/Phone #:

RECRA Project Manager: OJ

QC: Spec Del: Std TAT: 21 day

Date Rec'd: 11-7-00 Date Due: 11-28-00

Account #:

	A	B							C	1-D	E
Refrigerator #	1	S							S	1—	S	S
#/Type Container – Liquid												
#/Type Container – Solid	lag	lag							lag	1—	lag	lag
Volume – Liquid												
Volume – Solid	250	250							250	1—	250	250
Preservatives									—		—	—
ANALYSES REQUESTED	ORGANIC: VOA	BNA	Pest/PCB	Herb					INORG: ICP Metal	CN	IC Anions	pH
RECRA LabNet Use Only	OA24H	OA25H							ACRATO	ICNTO	ICNO3 ISFD	IPH

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	ICP Metal	CN	IC Anions	pH
001	B10F88			S	11/1/00	1040	X	X	X	✓	X	X
002	B10F89			1		0945	X	X	X	✓	X	X

Special Instructions: Saf B00-008

Run Matrix QC

DATE/REVISIONS:
1. → Sample #002 (Semi Voa analysis)
2. was received broken - able to
3. save sample.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill #
2) Ambient or (Chilled)
3) Received in Good Condition Y or (N) DS 11/7/00
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 2.0 °C

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
FedEx	D. Smith	11/7/00	0930				

COMPOSITE WASTE

ORIGINAL

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:
4235 7954 8327

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-068-83	Page 1 of 1
Collector JMorrison	Company Contact: D Weekes; Telephone No.: 372-9524	Project Coordinator: TRENT, SJ	Price Code: 8L; Data Turnaround: 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location: 200 West	SAF No.: B00-068	Air Quality ☐
Ice Chest No.: ERC 44-068 (1 OF 1)	Field Logbook No.: EL; COA: JRCRA03200	Method of Shipment: Fed-EX	
Shipped To: ~~TMA~~/RECRA TMS 11-1-00	Offsite Property No.: A010005	Bill of Lading/Air Bill No.: 4235 7453 0327	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None	None					
Type of Container	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1					
Volume	250mL	250mL	250mL	250mL	250mL					
SAMPLE ANALYSIS	Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {m-Cresol}	VOA - 8260A (TCL)	IC Anions - 300.0 {Nitrate}; Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace), Mercury - 7471 - (CV)	pH (Soil) - 9045	Til To:				

Sample No.	Matrix *	Sample Date	Sample Time									
B10F88	SOIL	11-01-00	1040	X	X	X	X	X	BOYWIL	200W-00-	0154	

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
TMorrison JMorrison	11-1-00 1530	TMS 11-1-00 Sorbin Ref #2B	11-1-00 1530
Relinquished By Removed from Ref #2B 3728 RT 11/6/00	Date/Time 1330 11/6/00	Received By RThoren	Date/Time 1030 11/6/00
Relinquished By RThoren	Date/Time 1330 11/6/00	Received By Fed Ex	Date/Time
Relinquished By Fed Ex	Date/Time 11-7-00/0930	Received By	Date/Time 11-7-00/0930
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

RT 11/6/00

SPECIAL INSTRUCTIONS

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11 1 00.
Collector not available to relinquish samples on 11/6/00 for shipment. RT 11/6/00

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-068-84	Page 1 of 1
Collector [signature]	Company Contact: D Weekes; Telephone No.: 372-9524	Project Coordinator: TRENT, SJ	Price Code: 8L; Data Turnaround: 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location: 200 West	SAF No.: B00-068	Air Quality ☐
Ice Chest No.: ERC 99-0164 (1 of 1)	Field Logbook No.: EL 15160; COA: JRCRA03200	Method of Shipment: Fed-EX	
Shipped To: ~~TMA~~/RECRA TMD 11-1-00	Offsite Property No.: A010005	Bill of Lading/Air Bill No.: 423579530327	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None	None					
Type of Container	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1					
Volume	250mL	250mL	250mL	250mL	250mL					
SAMPLE ANALYSIS	Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {m-Cresol}	VOA - 8260A (TCL)	IC Anions - 300.0 {Nitrate}; Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace); Mercury - 7471 - (CV)	pH (Soil) - 9045	TIE TO:				

Sample No.	Matrix *	Sample Date	Sample Time									
B10F89	SOIL	11-01-00	0945	X	X	X	X	X	B0YW17	2000-00-	0160	

CHAIN OF POSSESSION

Relinquished By / Date/Time	Received By / Date/Time
[signature] 11-1-00 1530	REF# 2B Stored in 11-1-00 530
Relinquished from Ref 2B 3728 11/6/00	[signature] R Thorp 11/6/00 1050
[signature] R Thorp 11/6/00 1032	FED EX
Fed Ex 11-7-00 0930	[signature] 11-7-00 0930

Sign/Print Names

SPECIAL INSTRUCTIONS

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11/1/00
Collector not available to relinquish samples on 11/6/00 for shipment..
RT 11/6/00

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B00-068 H1127

DATE RECEIVED: 11/07/00 RFW LOT # :0011L175

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B10F88						
SILVER, TOTAL	001	S	99L1732	11/01/00	11/21/00	11/24/00
SILVER, TOTAL	001 REP	S	99L1732	11/01/00	11/21/00	11/24/00
SILVER, TOTAL	001 MS	S	99L1732	11/01/00	11/21/00	11/24/00
ARSENIC, TOTAL	001	S	99L1732	11/01/00	11/21/00	11/24/00
ARSENIC, TOTAL	001 REP	S	99L1732	11/01/00	11/21/00	11/24/00
ARSENIC, TOTAL	001 MS	S	99L1732	11/01/00	11/21/00	11/24/00
BARIUM, TOTAL	001	S	99L1732	11/01/00	11/21/00	11/24/00
BARIUM, TOTAL	001 REP	S	99L1732	11/01/00	11/21/00	11/24/00
BARIUM, TOTAL	001 MS	S	99L1732	11/01/00	11/21/00	11/24/00
CADMIUM, TOTAL	001	S	99L1732	11/01/00	11/21/00	11/24/00
CADMIUM, TOTAL	001 REP	S	99L1732	11/01/00	11/21/00	11/24/00
CADMIUM, TOTAL	001 MS	S	99L1732	11/01/00	11/21/00	11/24/00
CHROMIUM, TOTAL	001	S	99L1732	11/01/00	11/21/00	11/24/00
CHROMIUM, TOTAL	001 REP	S	99L1732	11/01/00	11/21/00	11/24/00
CHROMIUM, TOTAL	001 MS	S	99L1732	11/01/00	11/21/00	11/24/00
MERCURY, TOTAL	001	S	00C0399	11/01/00	11/29/00	11/29/00
MERCURY, TOTAL	001 REP	S	00C0399	11/01/00	11/29/00	11/29/00
MERCURY, TOTAL	001 MS	S	00C0399	11/01/00	11/29/00	11/29/00
LEAD, TOTAL	001	S	99L1732	11/01/00	11/21/00	11/24/00
LEAD, TOTAL	001 REP	S	99L1732	11/01/00	11/21/00	11/24/00
LEAD, TOTAL	001 MS	S	99L1732	11/01/00	11/21/00	11/24/00
SELENIUM, TOTAL	001	S	99L1732	11/01/00	11/21/00	11/24/00
SELENIUM, TOTAL	001 REP	S	99L1732	11/01/00	11/21/00	11/24/00
SELENIUM, TOTAL	001 MS	S	99L1732	11/01/00	11/21/00	11/24/00
B10F89						
SILVER, TOTAL	002	S	99L1732	11/01/00	11/21/00	11/24/00
ARSENIC, TOTAL	002	S	99L1732	11/01/00	11/21/00	11/24/00
BARIUM, TOTAL	002	S	99L1732	11/01/00	11/21/00	11/24/00
CADMIUM, TOTAL	002	S	99L1732	11/01/00	11/21/00	11/24/00
CHROMIUM, TOTAL	002	S	99L1732	11/01/00	11/21/00	11/24/00
MERCURY, TOTAL	002	S	00C0399	11/01/00	11/29/00	11/29/00
LEAD, TOTAL	002	S	99L1732	11/01/00	11/21/00	11/24/00
SELENIUM, TOTAL	002	S	99L1732	11/01/00	11/21/00	11/24/00

LAB QC:

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B00-068 H1127

DATE RECEIVED: 11/07/00 RFW LOT # :0011L175

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SILVER LABORATORY	LC1 BS	S	99L1732	N/A	11/21/00	11/24/00
SILVER, TOTAL	MB1	S	99L1732	N/A	11/21/00	11/24/00
ARSENIC LABORATORY	LC1 BS	S	99L1732	N/A	11/21/00	11/24/00
ARSENIC, TOTAL	MB1	S	99L1732	N/A	11/21/00	11/24/00
BARIUM LABORATORY	LC1 BS	S	99L1732	N/A	11/21/00	11/24/00
BARIUM, TOTAL	MB1	S	99L1732	N/A	11/21/00	11/24/00
CADMIUM LABORATORY	LC1 BS	S	99L1732	N/A	11/21/00	11/24/00
CADMIUM, TOTAL	MB1	S	99L1732	N/A	11/21/00	11/24/00
CHROMIUM LABORATORY	LC1 BS	S	99L1732	N/A	11/21/00	11/24/00
CHROMIUM, TOTAL	MB1	S	99L1732	N/A	11/21/00	11/24/00
MERCURY LABORATORY	LC1 BS	S	00C0399	N/A	11/29/00	11/29/00
MERCURY, TOTAL	MB1	S	00C0399	N/A	11/29/00	11/29/00
LEAD LABORATORY	LC1 BS	S	99L1732	N/A	11/21/00	11/24/00
LEAD, TOTAL	MB1	S	99L1732	N/A	11/21/00	11/24/00
SELENIUM LABORATORY	LC1 BS	S	99L1732	N/A	11/21/00	11/24/00
SELENIUM, TOTAL	MB1	S	99L1732	N/A	11/21/00	11/24/00

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B00-068
RFW#: 0011L175
SDG/SAF#: H1127/B00-068

W.O.#: 10985-001-001-9999-00
Date Received: 11-07-00

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 solid samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

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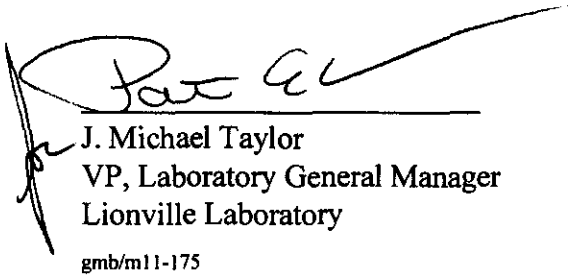
12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.



12-14-00

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

Date

gmb/m11-175

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 00111175

Leaching Procedure: __1310 __1311 __1312 __Other:_____

CLP Metals __ Digestion and __ Analysis Methods: __ILM03.0 __ILM04.0

Metals Digestion Methods: __3005A __3010A __3015 __3020A ✓3050B __3051 __200.7 __SS17
__Other: _____

Metals Analysis Methods

	SW846	EPA	STD MTD	EPA OSWR	USATHAMA
Aluminum	__6010B	__200.7			__99
Antimony	__6010B __7041 [5]	__200.7 __204.2			__99
Arsenic	✓6010B __7060A [5]	__200.7 __206.2	__3113B		__99
Barium	✓6010B	__200.7			__99
Beryllium	__6010B	__200.7			__99
Bismuth	__6010B [1]	__200.7 [1]		__1620	__99
Boron	__6010B	__200.7			__99
Cadmium	✓6010B __7131A [5]	__200.7 __213.2			__99
Calcium	__6010B	__200.7			__99
Chromium	✓6010B __7191 [5]	__200.7 __218.2			__SS17
Cobalt	__6010B	__200.7			__99
Copper	__6010B __7211 [5]	__200.7 __220.2			__99
Iron	__6010B	__200.7			__99
Lead	✓6010B __7421 [5]	__200.7 __239.2	__3113B		__99
Lithium	__6010B __7430 [4]	__200.7		__1620	__99
Magnesium	__6010B	__200.7			__99
Manganese	__6010B	__200.7			__99
Mercury	__7470A [3] ✓7471A [3]	__245.1 [2] __245.5 [2]			__99
Molybdenum	__6010B	__200.7			__99
Nickel	__6010B	__200.7			__99
Potassium	__6010B __7610 [4]	__200.7 __258.1 [4]			__99
Rare Earths	__6010B [1]	__200.7 [1]		__1620	__99
Selenium	✓6010B __7740 [5]	__200.7 __270.2	__3113B		__99
Silicon	__6010B [1]	__200.7		__1620	__99
Silica	__6010B	__200.7		__1620	__99
Silver	✓6010B __7761 [5]	__200.7 __272.2			__99
Sodium	__6010B __7770 [4]	__200.7 __273.1 [4]			__99
Strontium	__6010B	__200.7			__99
Thallium	__6010B __7841 [5]	__200.7 __279.2 __200.9			__99
Tin	__6010B	__200.7			__99
Titanium	__6010B	__200.7			__99
Uranium	__6010B [1]	__200.7 [1]		__1620	__99
Vanadium	__6010B	__200.7			__99
Zinc	__6010B	__200.7			__99
Zirconium	__6010B [1]	__200.7 [1]		__1620	__99

Other:_____ Method:_____

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LCS = Laboratory Control Sample.
NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.

2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).

3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).

4. Flame AA.

5. Graphite Furnace AA.

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INORGANICS DATA SUMMARY REPORT 11/30/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B10F88	Silver, Total	0.11 u	MG/KG	0.11	1.0
		Arsenic, Total	8.2	MG/KG	0.25	1.0
		Barium, Total	77.9	MG/KG	0.02	1.0
		Cadmium, Total	0.11	MG/KG	0.03	1.0
		Chromium, Total	7.7	MG/KG	0.06	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	7.4	MG/KG	0.22	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
-002	B10F89	Silver, Total	0.20	MG/KG	0.13	1.0
		Arsenic, Total	1.2	MG/KG	0.29	1.0
		Barium, Total	60.0	MG/KG	0.02	1.0
		Cadmium, Total	0.07	MG/KG	0.04	1.0
		Chromium, Total	34.1	MG/KG	0.07	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Lead, Total	6.0	MG/KG	0.26	1.0
		Selenium, Total	0.40 u	MG/KG	0.40	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 11/30/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L1732-MB1	Silver, Total	0.11 u	MG/KG	0.11	1.0
		Arsenic, Total	0.24 u	MG/KG	0.24	1.0
		Barium, Total	0.03	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	0.11	MG/KG	0.06	1.0
		Lead, Total	0.21 u	MG/KG	0.21	1.0
		Selenium, Total	0.33 u	MG/KG	0.33	1.0
BLANK1	00C0399-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

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INORGANICS ACCURACY REPORT 11/30/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B10F88	Silver, Total	5.1	0.11u	5.2	98.1	1.0
		Arsenic, Total	206	8.2	209	94.8	1.0
		Barium, Total	276	77.9	209	95.2	1.0
		Cadmium, Total	5.0	0.11	5.2	94.0	1.0
		Chromium, Total	27.8	7.7	20.9	96.2	1.0
		Mercury, Total	0.17	0.02u	0.17	97.7	1.0
		Lead, Total	57.1	7.4	52.2	95.2	1.0
		Selenium, Total	197	0.34u	209	94.5	1.0

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INORGANICS PRECISION REPORT 11/30/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B10F88	Silver, Total	0.11u	0.11u	NC	1.0
		Arsenic, Total	8.2	8.2	0.00	1.0
		Barium, Total	77.9	80.4	3.2	1.0
		Cadmium, Total	0.11	0.13	17.0	1.0
		Chromium, Total	7.7	7.3	5.3	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Lead, Total	7.4	7.4	0.00	1.0
		Selenium, Total	0.34u	0.34u	NC	1.0

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 11/30/00

CLIENT: TNUHANFORD B00-068 H1127 RECRA LOT #: 0011L175

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99L1732-LC1	Silver, LCS	49.3	50.0	MG/KG	98.6
		Arsenic, LCS	955	1000	MG/KG	95.5
		Barium, LCS	491	500	MG/KG	98.2
		Cadmium, LCS	24.6	25.0	MG/KG	98.4
		Chromium, LCS	49.5	50.0	MG/KG	99.0
		Lead, LCS	243	250	MG/KG	97.3
		Selenium, LCS	938	1000	MG/KG	93.8
LCS1	00C0399-LC1	Mercury, LCS	0.64	0.7	MG/KG	89.5

RECRA LabNet Use Only

00111175

Custody Transfer Record/Lab Work Request

Page 1 of 1

RECRA LabNet

ALL FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TMU-Hanford B00-0108

Est. Final Proj. Sampling Date:

Project #: 10985-001-001-9999-00

Project Contact/Phone #:

RECRA Project Manager: DJ

QC: Spec Del: Std TAT: 21 day

Date Rec'd: 11-7-00 Date Due: 11-28-00

Account #:

Refrigerator #		A	B						C	D		E				
#/Type Container	Liquid	1	S						S	1	S	S				
	Solid	1ag	1ag						1ag	1	1ag	1ag				
Volume	Liquid															
	Solid	250	250						250	1	250	250				
Preservatives									1		1	1				
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb				ICP Metal	CN	IC Anions	#				
		RECRA LabNet Use Only														
		0024H	0025H						RCRA TO	ICP TO	ICP 3 ISPD	IPH				

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected												
S - Soil, SE - Sediment, SD - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, L - EP/TCLP Leachate, WI - Wipe, X - Other, F - Fish	001	B10F88			S	11/1/00	1040	X	X					X	✓	X	X		
	002	B10F89			1		0945	X	X					X	✓	X	X		

Special Instructions: SAF B00-0108

Run Matrix QC

DATE/REVISIONS:

1. Sample #002 (Semi Voa analysis)
2. Was received broken - able to
3. Save Sample.
4.
5.
6.

RECRA LabNet Use Only

Samples were: 1) Shipped ___ or Hand Delivered ___

Airbill #

2) Ambient or Chilled

3) Received in Good Condition Y or N

DS11/7/00

4) Labels Indicate Properly Preserved Y or N

5) Received Within Holding Times Y or N

COC Tape was: 1) Present on Outer Package Y or N; 2) Unbroken on Outer Package Y or N; 3) Present on Sample Y or N; 4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Cooler Temp. 2.0 °C

Relinquished by	Received by	Date	Time
Fed Ex	DJ Smith	11/7/00	0930

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL RETURNED		

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES:

4235 7954 8527

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-068-83	Page 1 of 1
Collector Thomson	Company Contact D Weekes; Telephone No. 372-9524	Project Coordinator TRENT, SJ	Price Code 8L; Data Turnaround 21 Days
Project Designation 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location 200 West	SAF No. B00-068	Air Quality ☐
Ice Chest No. ERC 99-068 (1 OF 1)	Field Logbook No. EL; COA JRCRA03200	Method of Shipment Fed-EX	
Shipped To ~~TMA/~~RECRA TMS 11-1-00	Offsite Property No. A010005	Bill of Lading/Air Bill No. 4235 7953 0327	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation				Cool 4C	Cool 4C	None	None	None			
Type of Container				aG	aG	aG	aG	aG			
No. of Container(s)				1	1	1	1	1			
Volume				250mL	250mL	250mL	250mL	250mL			
SAMPLE ANALYSIS				Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (m-Cresol)	VOA - 8260A (TCL)	IC Anions - 300.0 (Nitrate); Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace); Mercury - 7471 - (CV)	pH (Soil) - 9045	Tie To:		
Sample No.	**Matrix ***	**Sample Date**	**Sample Time**								
B10F88	SOIL	11-01-00	1040	X	X	X	X	X	BOYWL6	200W-00-	015A

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Thomson Thomson	11-1-00 1530	TMS 11-1-00 Stored in Ref #2B	11-1-00 1530
Removed from Ref 2B 3728 RT/AY A/Hones (R.T. 11/6/00)	11/6/00 1030	R.T. RThoren	11/6/00 1030
R.T. RThoren	11/6/00 1930	Fed Ex	
Fed Ex	11-7-00/0930	D. [illegible]	11-7-00 / 0930

SPECIAL INSTRUCTIONS

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11 1 00.
Collector not available to relinquish samples on 11/6/00 for shipment. R.T. 11/6/00

Matrix *
S=Soil
SE=Sediment
SO=Solid
S=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

13

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-068-84	Page 1 of 1

Collector [illegible]	Company Contact: D Weekes / Telephone No.: 372-9524	Project Coordinator: TRENT, SJ	Price Code: 8L / Data Turnaround: 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location: 200 West	SAF No.: B00-068	Air Quality ☐
Ice Chest No.: ERC 99-0164 (1 of 1)	Field Logbook No.: EL 15116 / COA: JRCRA03200	Method of Shipment: Fed-EX	
Shipped To: TMA/RECRA TMD 11-1-00	Offsite Property No.: A010005	Bill of Lading/Air Bill No.: 42357953 0327	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None	None						
Type of Container	aG	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1	1						
Volume	250mL	250mL	250mL	250mL	250mL						
SAMPLE ANALYSIS	Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) (m-Cresol)	VOA - 8260A (TCL)	IC Anions - 300.0 (Nitrate); Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace); Mercury - 7471 - (CV)	pH (Soil) - 9045	TIE TO:					

Sample No.	Matrix *	Sample Date	Sample Time									
B10F89	SOIL	11-01-00	0445	X	X	X	X	X	B04	W17	2000-00-	0160

CHAIN OF POSSESSION / Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[illegible]	11-1-00 1530	TMD	11-1-00 1530
Removed from 2B 3728	11/6/00 1050	REF# 2B 3728 RT Thorp	11/6/00 1050
RT Thorp	11/6/00 1030	FED EX	
Fed Ex	11-7-00 0930	[illegible]	11-7-00 0930

SPECIAL INSTRUCTIONS

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11/1/00.
Collector not available to relinquish samples on 11/6/00 for shipment..
RT 11/6/00

Matrix *: S=Soil; SE=Sediment; SO=Solid; S=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Recra LabNet - Lionville Laboratory
BNA ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B00-068 H1127

DATE RECEIVED: 11/07/00 RFW LOT # :0011L175

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B10F88	001	S	00LE1450	11/01/00	11/08/00	11/21/00
B10F88	001 MS	S	00LE1450	11/01/00	11/08/00	11/21/00
B10F88	001 MSD	S	00LE1450	11/01/00	11/08/00	11/21/00
B10F89	002	S	00LE1450	11/01/00	11/08/00	11/22/00
LAB QC:						
SBLKGF	MB1	S	00LE1450	N/A	11/08/00	11/21/00
SBLKGF	MB1 BS	S	00LE1450	N/A	11/08/00	11/21/00

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B00-068
RFW #: 0011L175
SDG/SAF #: H1127/B00-068

W.O. #: 10985-001-001-9999-00
Date Received: 11-07-00

SEMIVOLATILE

The set of samples consisted of two (2) soil samples collected on 11-01-00.

The samples and their associated QC samples were extracted on 11-08-00 and analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8270C for TCL Semivolatiles on 11-21-00.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The samples were extracted and analyzed within required holding times.

3. Non-target compounds were identified in these samples.

4. One (1) of thirty-six (36) surrogate recoveries was outside EPA QC limits. However, EPA CLP surrogate recovery criteria were met (i.e., no more than one outlier per fraction {acid and base neutral} and no recoveries less than 10%).

5. Three (3) of twenty-two (22) matrix spike recoveries were outside EPA QC limits.

6. One (1) of eleven (11) blank spike recoveries was outside acceptance criteria..

7. The method blank contained the common laboratory contaminants Bis(2-Ethylhexyl)phthalate at a level less than the CRQL.

8. Low recoveries were reported for 2,4,6-Tribromophenol and for the spike compound, Pentachlorophenol. The presence of 1,3,5-Tribromo-2-methoxy Benzene and Pentachloromethoxy Benzene in the Chromatograms indicated that a conversion had occurred during the extraction process. The conversion product for 2,4,6-Tribromophenol has been reported as a non-target compound. Spectras and quanitation reports for the pentachlorophenol conversion product have been included in the blank and matrix spike analyses. Pentachlorophenol conversion was not detected in the unspiked sample analyses. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

9. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in Section III ("Technical Flags For Manual Integration"); hard copies of the integrations have been included with the quantitation data.

10. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

by _____ 12-11-00

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

Date

pef\group\data\bna\mu-hanford-11-175.doc

GLOSSARY OF BNA DATA

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Suffix added to sample number to indicate that results are from a diluted analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP, Z = Indicates Spiked Compound.

GLOSSARY OF BNA DATA

DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.

J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

D = Identifies all compounds identified in an analysis at a secondary dilution factor.

I = Interference.

NQ = Result qualitatively confirmed but not able to quantify.

A = Indicates that a TIC is a suspected aldol-condensation product.

N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).

Y = Additional qualifiers used as required are explained in the case narrative.

TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quan modifications or integrations are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quan modifications:

MP - Missed Peak: manually added peak not found by automatic quan program.

PA - Peak Assignment: quan report was changed to reflect correct peak assignment.

RI - Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene which are poorly resolved on the BNA column.

SP - Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.

CB - Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background signal, or other interference.

PI - Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.

Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, HSL List — Report Date: 11/27/00 08:59

RFW Batch Number: **0011L175** Client: **TNUHANFORD B00-068 H1127** Work Order: 10985001001 Page: 1a

	Cust ID:	B10F88	B10F88	B10F88	B10F89	SBLKGF	SBLKGF BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	00LE1450-MB1	00LE1450-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	87 %	80 %	74 %	78 %	89 %	83 %
	2-Fluorobiphenyl	89 %	84 %	80 %	77 %	96 %	84 %
	Terphenyl-d14	114 %	112 %	102 %	89 %	120 %	111 %
	Phenol-d5	79 %	76 %	71 %	71 %	90 %	78 %
	2-Fluorophenol	79 %	78 %	76 %	73 %	89 %	82 %
	2,4,6-Tribromophenol	35 %	86 %	79 %	51 %	14 * %	87 %
Phenol		370 U	74 %	71 %	430 U	330 U	78 %
bis(2-Chloroethyl)ether		370 U	360 U	360 U	430 U	330 U	330 U
2-Chlorophenol		370 U	75 %	73 %	430 U	330 U	78 %
1,3-Dichlorobenzene		370 U	360 U	360 U	430 U	330 U	330 U
1,4-Dichlorobenzene		370 U	72 %	71 %	430 U	330 U	77 %
1,2-Dichlorobenzene		370 U	360 U	360 U	430 U	330 U	330 U
2-Methylphenol		370 U	360 U	360 U	430 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)		370 U	360 U	360 U	430 U	330 U	330 U
3- and/or 4-Methylphenol		370 U	360 U	360 U	430 U	330 U	330 U
N-Nitroso-di-n-propylamine		370 U	77 %	79 %	430 U	330 U	80 %
Hexachloroethane		370 U	360 U	360 U	430 U	330 U	330 U
Nitrobenzene		370 U	360 U	360 U	430 U	330 U	330 U
Isophorone		370 U	360 U	360 U	430 U	330 U	330 U
2-Nitrophenol		370 U	360 U	360 U	430 U	330 U	330 U
2,4-Dimethylphenol		370 U	360 U	360 U	430 U	330 U	330 U
bis(2-Chloroethoxy)methane		370 U	360 U	360 U	430 U	330 U	330 U
2,4-Dichlorophenol		370 U	360 U	360 U	430 U	330 U	330 U
1,2,4-Trichlorobenzene		370 U	76 %	74 %	430 U	330 U	82 %
Naphthalene		370 U	360 U	360 U	430 U	330 U	330 U
4-Chloroaniline		370 U	360 U	360 U	430 U	330 U	330 U
Hexachlorobutadiene		370 U	360 U	360 U	430 U	330 U	330 U
4-Chloro-3-methylphenol		370 U	84 %	75 %	430 U	330 U	82 %
2-Methylnaphthalene		370 U	360 U	360 U	430 U	330 U	330 U
Hexachlorocyclopentadiene		370 U	360 U	360 U	430 U	330 U	330 U
2,4,6-Trichlorophenol		370 U	360 U	360 U	430 U	330 U	330 U
2,4,5-Trichlorophenol		930 U	910 U	910 U	1100 U	830 U	830 U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 0011L175 Client: TNUHANFORD B00-068 H1127 Work Order: 10985001001 Page: 1b

Cust ID:	B10F88	B10F88	B10F88	B10F89	SBLKGF	SBLKGF BS
RFW#:	001	001 MS	001 MSD	002	00LE1450-MB1	00LE1450-MB1
2-Chloronaphthalene	370 U	360 U	360 U	430 U	330 U	330 U
2-Nitroaniline	930 U	910 U	910 U	1100 U	830 U	830 U
Dimethylphthalate	370 U	360 U	360 U	430 U	330 U	330 U
Acenaphthylene	370 U	360 U	360 U	430 U	330 U	330 U
2,6-Dinitrotoluene	370 U	360 U	360 U	430 U	330 U	330 U
3-Nitroaniline	930 U	910 U	910 U	1100 U	830 U	830 U
Acenaphthene	370 U	83 %	81 %	430 U	330 U	84 %
2,4-Dinitrophenol	930 U	910 U	910 U	1100 U	830 U	830 U
4-Nitrophenol	930 U	71 %	61 %	1100 U	830 U	64 %
Dibenzofuran	370 U	360 U	360 U	430 U	330 U	330 U
2,4-Dinitrotoluene	370 U	91 * %	87 %	430 U	330 U	90 * %
Diethylphthalate	370 U	360 U	360 U	430 U	330 U	330 U
4-Chlorophenyl-phenylether	370 U	360 U	360 U	430 U	330 U	330 U
Fluorene	370 U	360 U	360 U	430 U	330 U	330 U
4-Nitroaniline	930 U	910 U	910 U	1100 U	830 U	830 U
4,6-Dinitro-2-methylphenol	930 U	910 U	910 U	1100 U	830 U	830 U
N-Nitrosodiphenylamine (1)	370 U	360 U	360 U	430 U	330 U	330 U
4-Bromophenyl-phenylether	370 U	360 U	360 U	430 U	330 U	330 U
Hexachlorobenzene	370 U	360 U	360 U	430 U	330 U	330 U
Pentachlorophenol	930 U	9 * %	3 * %	1100 U	830 U	21 %
Phenanthrene	370 U	360 U	360 U	430 U	330 U	330 U
Anthracene	370 U	360 U	360 U	430 U	330 U	330 U
Carbazole	370 U	360 U	360 U	430 U	330 U	330 U
Di-n-butylphthalate	370 U	360 U	360 U	430 U	330 U	330 U
Fluoranthene	370 U	360 U	360 U	430 U	330 U	330 U
Pyrene	370 U	106 %	95 %	430 U	330 U	104 %
Butylbenzylphthalate	370 U	360 U	360 U	430 U	330 U	330 U
3,3'-Dichlorobenzidine	370 U	360 U	360 U	430 U	330 U	330 U
Benzo(a)anthracene	370 U	360 U	360 U	430 U	330 U	330 U
Chrysene	370 U	360 U	360 U	430 U	330 U	330 U
bis(2-Ethylhexyl)phthalate	430 B	300 JB	350 JB	550 B	530	220 JB
Di-n-octyl phthalate	370 U	360 U	360 U	430 U	330 U	330 U
Benzo(b)fluoranthene	370 U	360 U	360 U	430 U	330 U	330 U
Benzo(k)fluoranthene	370 U	360 U	360 U	430 U	330 U	330 U
Benzo(a)pyrene	370 U	360 U	360 U	430 U	330 U	330 U
Indeno(1,2,3-cd)pyrene	370 U	360 U	360 U	430 U	330 U	330 U
Dibenz(a,h)anthracene	370 U	360 U	360 U	430 U	330 U	330 U
Benzo(g,h,i)perylene	370 U	360 U	360 U	430 U	330 U	330 U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

1F

CLIENT SAMPLE NO.

B10F88

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Recra.LabNet Work Order: 10985001001

Client: TNUHANFORD B00-068 H1127

Matrix: (soil/water) SOIL Lab Sample ID: 0011L175-001

Sample wt/vol: 30.1 (g/mL) G Lab File ID: A112110

Level: (low/med) LOW Date Received: 11/07/00

% Moisture: 10 decanted: (Y/N) Date Extracted: 11/08/00

Concentrated Extract Volume: 1000(uL) Date Analyzed: 11/21/00

Injection Volume: 2.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH:

Number TICs found: 5 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	20.12	600	JB
2.		UNKNOWN	21.87	100	J
3.		UNKNOWN	23.35	200	JB
4.		UNKNOWN	26.59	100	JB
5.		ALKANE	27.10	300	J

1F

CLIENT SAMPLE NO.

B10F89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Recra.LabNet Work Order: 10985001001

Client: TNUHANFORD B00-068 H1127

Matrix: (soil/water) SOIL Lab Sample ID: 0011L175-002

Sample wt/vol: 31.0 (g/mL) G Lab File ID: A112211

Level: (low/med) LOW Date Received: 11/07/00

% Moisture: 25 decanted: (Y/N) Date Extracted: 11/08/00

Concentrated Extract Volume: 1000(uL) Date Analyzed: 11/22/00

Injection Volume: 2.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH:

Number TICs found: 5 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	20.07	500	JB
2.		UNKNOWN	21.83	300	J
3.		UNKNOWN	23.28	200	JB
4.		UNKNOWN	23.32	300	JB
5.		UNKNOWN	25.01	200	J

1F

CLIENT SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SBLKGF

Lab Name: Recra.LabNet Work Order: 10985001001

Client: TNUHANFORD B00-068 H1127

Matrix: (soil/water) SOIL Lab Sample ID: 00LE1450-MB1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A112108

Level: (low/med) LOW Date Received: 11/08/00

% Moisture: _____ decanted: (Y/N)__ Date Extracted: 11/08/00

Concentrated Extract Volume: 1000(uL) Date Analyzed: 11/21/00

Injection Volume: 2.0(uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: _____

Number TICs found: 5 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	20.12	900	J
2.		UNKNOWN	23.01	100	J
3.		UNKNOWN	23.05	200	J
4.		UNKNOWN	23.36	400	J
5.		UNKNOWN	26.59	100	J

RECRA LabNet Use Only

0011L175

AU

Custody Transfer Record/Lab Work Request

Page 1 of 1

RECRA LabNet

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU-Hanford B00-068
Est. Final Proj. Sampling Date:
Project #: 10985-001-001-9999-00
Project Contact/Phone #:
RECRA Project Manager: QJ
QC: Spec Del: Std TAT: 21 day
Date Rec'd: 11-7-00 Date Due: 11-28-00
Account #:

	A	B						C	D	E				
Refrigerator #	1	S						S	S	S				
#/Type Container Liquid														
#/Type Container Solid	1ag	1ag						1ag	1ag	1ag				
Volume Liquid														
Volume Solid	250	250						250	250	250				
Preservatives								—	—	—				
ANALYSES REQUESTED	ORGANIC: VOA	BNA	Pest/PCB	Herb				INORG: TCLP Metal	CN	IC Anions	#			

RECRA LabNet Use Only

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	OC24H	OC25H						RCRATO	ICNTO	ICNO3 ISFD	TPH			
001	B10F88			S	11/1/00	1040	X	X						X	✓	X	X			
002	B10F89			1		0945	X	X						X	✓	X	X			

Special Instructions: Saf B00-068

Run Matrix QC

DATE/REVISIONS:
1. Sample #002 (Semi Voa analysis)
2. was received broken - able to
3. save sample.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or Hand Delivered ___
Airbill # ___
2) Ambient or (Chilled)
3) Received in Good Condition Y or (N) DS 11/7/00
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp. 2.0 °C

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
FedEx	D. [signature]	11/7/00	0930				

COMPOSITE WASTE

ORIGINAL

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:
4235 7954 8327

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-068-83	Page 1 of 1

Collector: Thomson	Company Contact: D Weekes — Telephone No. 372-9524	Project Coordinator: TRENT, SJ	Price Code 8L — Data Turnaround 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location: 200 West	SAF No. B00-068	Air Quality ☐
Ice Chest No. ERC 99-068 (1 OF 1)	Field Logbook No. EL — COA JRCRA03200	Method of Shipment: Fed-EX	
Shipped To: ~~TMA~~/RECRA TMS 11-1-00	Offsite Property No. A010005	Bill of Lading/Air Bill No. 4255 7953 0327	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None	None	
Type of Container	aG	aG	aG	aG	aG	
No. of Container(s)	1	1	1	1	1	
Volume	250mL	250mL	250mL	250mL	250mL	
SAMPLE ANALYSIS	Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (m-Cresol)	VOA - 8260A (TCL)	IC Anions - 300.0 (Nitrate); Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace); Mercury - 7471 - (CV)	pH (Soil) - 9045	Tie To:

Sample No.	Matrix *	Sample Date	Sample Time						
B10F88	SOIL	11-01-00	1040	X	X	X	X	X	B0YW16 200W-00-0154

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: Thomson Thomson	Date/Time 11-1-00 1530	Received By: TMS 11-1-00 Stored in Ref #2B	Date/Time 11-1-00 1530
Relinquished By: Removed from Ref 2B 3728 (R.T. 11/6/00)	Date/Time 11/6/00 1030	Received By: R Thoren	Date/Time 11/6/00 1030
Relinquished By: R Thoren	Date/Time 11/6/00 1130	Received By: FedEx	Date/Time
Relinquished By: Fed Ex	Date/Time 11.7.00/0930	Received By: [signature]	Date/Time 11.7.00/0930
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11/1/00. Collector not available to relinquish samples on 11/6/00 for shipment. R.T. 11/6/00

Matrix *: S=Soil, SE=Sediment, SO=Solid, S=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-068-84	Page 1 of 1
Collector [illegible]	Company Contact: D Weekes; Telephone No.: 372-9524	Project Coordinator: TRENT, SJ	Price Code: 8L; Data Turnaround: 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location: 200 West	SAF No.: B00-068	Air Quality ☐
Ice Chest No.: ERC 99-0064 (1 of 1)	Field Logbook No.: EL 15116; COA: JRCRA03200	Method of Shipment: Fed-EX	
Shipped To: TMA/RECRA TMD 11-1-00	Offsite Property No.: A010005	Bill of Lading/Air Bill No.: 423579530327	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	None	None					
Type of Container	aG	aG	aG	aG	aG					
No. of Container(s)	1	1	1	1	1					
Volume	250mL	250mL	250mL	250mL	250mL					
SAMPLE ANALYSIS	Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) (m-Cresol)	VOA - 8260A (TCL)	IC Anions - 300.0 (Nitrate); Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace); Mercury - 7471 - (CV)	pH (Soil) - 9045	Tie To:				
Sample No.	Matrix *	Sample Date	Sample Time							
B10F89	SOIL	11-01-00	0445	X	X	X	X	X	B04	W17	2000-00-01600

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By / Date/Time	Received By / Date/Time
[illegible] 11-1-00 1530	TMD 11-1-00 1530
Removed from Ref# 2B 3728 11/6/00 1050	R Thorp 11/6/00 1050
R Thorp 11/6/00 1032	FED EX
Fed Ex 11.7.00/0930	11.7.00/0930

SPECIAL INSTRUCTIONS

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11/1/00
Collector not available to relinquish samples on 11/6/00 for shipment..
RT 11/6/00

Matrix *: S=Soil; SE=Sediment; SO=Solid; S=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Figure 1. Sample Check-in List

Date/Time Received: 11-7-00 / 0930

SDG#: 00116175

Work Order Number: - SAF# 300-008

Shipping Container ID: - Chain of Custody # 300-008-83

1. Custody Seals on shipping container intact? Yes [Y] No [ ]
2. Custody Seals dated and signed? Yes [Y] No [ ]
3. Chain-of-Custody record present? Yes [Y] No [ ]
4. Cooler temperature 2.0°C
5. Vermiculite/packing materials is Wet [ ] Dry [Y]
6. Number of samples in shipping container: 10
7. Sample holding times exceeded? Yes [ ] No [Y]

8. Samples have:
   - ✓ tape
   - ____ hazard labels
   - ____ custody seals
   - ✓ appropriate sample labels

9. Samples are:
   - ✓ in good condition
   - ____ leaking
   - ✓ broken #002 semi-VOA
   - ____ have air bubbles

10. Were any anomalies identified in sample receipt? Yes [ ] No [Y]
11. Description of anomalies (include sample numbers): N/A

Sample Custodian/Laboratory: TKappel / Becca Date: 11-7-00

Telephoned to: _____ On _____ By _____

Recra LabNet - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
TNUHANFORD B00-068 H1127

DATE RECEIVED: 11/07/00 RFW LOT # :0011L175

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B10F88	001	S	00LVH484	11/01/00	N/A	11/10/00
B10F88	001 MS	S	00LVH484	11/01/00	N/A	11/10/00
B10F88	001 MSD	S	00LVH484	11/01/00	N/A	11/10/00
B10F89	002	S	00LVH484	11/01/00	N/A	11/10/00
LAB QC:						
VBLKXS	MB1	S	00LVH484	N/A	N/A	11/10/00
VBLKXS	MB1 BS	S	00LVH484	N/A	N/A	11/10/00

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B00-068
RFW #: 0011L175
SDG/SAF #: H1127/B00-068

W.O. #: 10985-001-001-9999-00
Date Received: 11-07-00

GC/MS VOLATILE

The set of samples consisted of two (2) soil samples collected on 11-01-00.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 11-10-00.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The samples were analyzed within required holding time.

3. Non-target compounds were detected in Sample B10F89.

4. All surrogate recoveries were within EPA QC limits.

5. All matrix spike recoveries were within EPA QC limits.

6. All blank spike recoveries were within EPA QC limits.

7. The method blank contained the common laboratory contaminant Methylene Chloride at levels less than 3x the CRQL.

8. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

by _____ 11-28-00
J. Michael Taylor — Date
VP, Laboratory General Manager
Lionville Laboratory

pef\group\data\voa\tnu-hanford-11-175.doc

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

GLOSSARY OF VOA DATA

DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.

J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

D = Identifies all compounds identified in an analysis at a secondary dilution factor.

I = Interference.

NQ = Result qualitatively confirmed but not able to quantify.

N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).

Y = Additional qualifiers used as required are explained in the case narrative.

GLOSSARY OF VOA DATA

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Suffix added to sample number to indicate that results are from a diluted analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP, Z = Indicates Spiked Compound.

Recra LabNet - Lionville Laboratory

Volatiles by GC/MS, HSL List — Report Date: 11/20/00 14:43

RFW Batch Number: **0011L175** Client: **TNUHANFORD B00-068 H1127** Work Order: 10985001001 Page: 1a

	Cust ID:	B10F88	B10F88	B10F88	B10F89	VBLKXS	VBLKXS BS
Sample Information	RFW#:	001	001 MS	001 MSD	002	00LVH484-MB1	00LVH484-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.02	0.980	1.00	0.962	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Toluene-d8	103 %	101 %	101 %	100 %	105 %	101 %
	Bromofluorobenzene	91 %	87 %	86 %	89 %	92 %	89 %
	1,2-Dichloroethane-d4	101 %	101 %	96 %	91 %	92 %	96 %
Chloromethane		11 U	11 U	11 U	13 U	10 U	10 U
Bromomethane		11 U	11 U	11 U	13 U	10 U	10 U
Vinyl Chloride		11 U	11 U	11 U	13 U	10 U	10 U
Chloroethane		11 U	11 U	11 U	13 U	10 U	10 U
Methylene Chloride		30 B	22 B	21 B	20 B	12	13 B
Acetone		11 U	11 U	11 U	13 U	10 U	10 U
Carbon Disulfide		6 U	6 U	6 U	6 U	5 U	5 U
1,1-Dichloroethene		6 U	105 %	93 %	6 U	5 U	100 %
1,1-Dichloroethane		6 U	6 U	6 U	6 U	5 U	5 U
1,2-Dichloroethene (total)		6 U	6 U	6 U	6 U	5 U	5 U
Chloroform		6 U	6 U	6 U	6 U	5 U	5 U
1,2-Dichloroethane		6 U	6 U	6 U	6 U	5 U	5 U
2-Butanone		11 U	11 U	11 U	13 U	10 U	10 U
1,1,1-Trichloroethane		6 U	6 U	6 U	6 U	5 U	5 U
Carbon Tetrachloride		6 U	6 U	6 U	6 U	5 U	5 U
Bromodichloromethane		6 U	6 U	6 U	6 U	5 U	5 U
1,2-Dichloropropane		6 U	6 U	6 U	6 U	5 U	5 U
cis-1,3-Dichloropropene		6 U	6 U	6 U	6 U	5 U	5 U
Trichloroethene		6 U	97 %	95 %	6 U	5 U	94 %
Dibromochloromethane		6 U	6 U	6 U	6 U	5 U	5 U
1,1,2-Trichloroethane		6 U	6 U	6 U	6 U	5 U	5 U
Benzene		6 U	98 %	96 %	6 U	5 U	95 %
Trans-1,3-Dichloropropene		6 U	6 U	6 U	6 U	5 U	5 U
Bromoform		6 U	6 U	6 U	6 U	5 U	5 U
4-Methyl-2-pentanone		11 U	11 U	11 U	13 U	10 U	10 U
2-Hexanone		11 U	11 U	11 U	13 U	10 U	10 U
Tetrachloroethene		6 U	6 U	6 U	6 U	5 U	5 U
1,1,2,2-Tetrachloroethane		6 U	6 U	6 U	6 U	5 U	5 U
Toluene		6 U	108 %	107 %	6 U	5 U	106 %

*= Outside of EPA CLP QC limits.

RFW Batch Number: **0011L175** Client: **TNUHANFORD B00-068 H1127** Work Order: 10985001001 Page: 1b

	Cust ID:	**B10F88**	**B10F88**	**B10F88**	**B10F89**	**VBLKXS**	**VBLKXS BS**
	RFW#:	**001**	**001 MS**	**001 MSD**	**002**	**00LVH484-MB1**	**00LVH484-MB1**
Chlorobenzene		6 U	106 %	106 %	6 U	5 U	105 %
Ethylbenzene		6 U	6 U	6 U	6 U	5 U	5 U
Styrene		6 U	6 U	6 U	6 U	5 U	5 U
Xylene (total)		6 U	6 U	6 U	6 U	5 U	5 U

*= Outside of EPA CLP QC limits.

1E

VOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B10F88

Lab Name: Recra.LabNet Contract: 10985001001

Lab Code: Recra Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 0011L175-001

Sample wt/vol: 4.90 (g/mL) G Lab File ID: h111014

Level: (low/med) LOW Date Received: 11/07/00

% Moisture: not dec. 10 Date Analyzed: 11/10/00

Column: (pack/cap) CAP Dilution Factor: 1.02

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				

1E

VOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B10F89

Lab Name: Recra.LabNet Contract: 10985001001

Lab Code: Recra Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 0011L175-002

Sample wt/vol: 5.20 (g/mL) G Lab File ID: h111017

Level: (low/med) LOW Date Received: 11/07/00

% Moisture: not dec. 25 Date Analyzed: 11/10/00

Column: (pack/cap) CAP Dilution Factor: 0.962

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		SILOXANE	22.38	8	J

FORM 1 VOA-TIC 1/87 Rev.

1E

VOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLKXS

Lab Name: Recra.LabNet Contract: 10985001001

Lab Code: Recra Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 00LVH484-MB1

Sample wt/vol: 5.00 (g/mL) G Lab File ID: h111009

Level: (low/med) LOW Date Received: 11/10/00

% Moisture: not dec. 0 Date Analyzed: 11/10/00

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0 CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.					

RECRA LabNet Use Only
0011L175

AU

Custody Transfer Record/Lab Work Request

Page 1 of 1

RECRA LabNet

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Client: TNU-Hanford B00-068
Est. Final Proj. Sampling Date:
Project #: 10985-001-001-9999-00
Project Contact/Phone #:
RECRA Project Manager: OJ
QC: Spec Del: Std TAT: 21 day
Date Rec'd: 11-7-00 Date Due: 11-28-00
Account #:

	A	B	C	D	E
Refrigerator #	1	S	S	1—S	S
#/Type Container – Liquid					
#/Type Container – Solid	1ag	1ag	1ag	1ag	1ag
Volume – Liquid					
Volume – Solid	250	250	250	250	250
Preservatives			—	—	—
ANALYSES REQUESTED	VOA	BNA	ICP Metal	CN / He Anions	TPH
RECRA LabNet Use Only	0024H	0025H	RCRATO	IcnTO	Icno3 ISFD / IPH

MATRIX CODES: S - Soil, SE - Sediment, SO - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, L - EP/TCLP Leachate, WI - Wipe, X - Other, F - Fish

Lab ID	Client ID/Description	MS	MSD	Matrix	Date Collected	Time Collected	VOA (0024H)	BNA (0025H)	Pest/PCB	Herb	ICP Metal (RCRATO)	CN (IcnTO)	Anions (Icno3 ISFD)	TPH (IPH)
001	B10F88			S	11/1/00	1040	X	X			X	✓	X	X
002	B10F89			1		0945	X	X			X	✓	X	X

Special Instructions: Saf B00-068

Run Matrix QC

DATE/REVISIONS:
→ 1. Sample #002 (Semi Voa analysis)
2. was received broken. - able to
3. save sample.
4.
5.
6.

RECRA LabNet Use Only
Samples were: 1) Shipped ✓ or Hand Delivered
Airbill #
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or (N) DS 11/7/00
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N
COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec'l (Y) or N
Cooler Temp 2.0 °C

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
Fed Ex	D. Smith	11/7/00	0930				

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:

COMPOSITE ORIGINAL

4235 7954 (1/97)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B00-068-83	Page 1 of 1
Collector: Johnson	Company Contact: D Weekes; Telephone No.: 372-9524	Project Coordinator: TRENT, SJ	Price Code: 8L; Data Turnaround: 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location: 200 West	SAF No.: B00-068	Air Quality [ ]
Ice Chest No.: ERC 94-068 (1 OF 1)	Field Logbook No.: EL; COA: JRCRA03200	Method of Shipment: Fed-EX	
Shipped To: ~~TMA~~/RECRA TMJ 11-1-00	Offsite Property No.: A010005	Bill of Lading/Air Bill No.: 4235 7953 0327	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

		Preservation	Cool 4C	Cool 4C	None	None	None					
		Type of Container	aG	aG	aG	aG	aG					
		No. of Container(s)	1	1	1	1	1					
		Volume	250mL	250mL	250mL	250mL	250mL					
SAMPLE ANALYSIS			Semi-VOA - 8270A (TCL), Semi-VOA -- 8270A (Add-On) (m-Cresol)	VOA - 8260A (TCL)	IC Anions - 300.0 (Nitrate); Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace), Mercury - 7471 - (CV)	pH (Soil) - 9045	Tie To:				
Sample No.	Matrix *	Sample Date	Sample Time									
B10F88	SOIL	11-01-00	1040	X	X	X	X	X	BOYWIL	2000-00-	0154	

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By: Thompson Thompson	11-1-00 1530	Received By: TMJ 11-1-00 Stored in Ref #2B	11-1-00 1530
Relinquished By: Removed from Ref 2B 3728 (RT 11/6/00)	11/6/00 1030	Received By: R Thoren	11/6/00 1030
Relinquished By: R Thoren	11/6/00 1330	Received By: Fed Ex	
Relinquished By: Fed Ex	11-7-00/0930	Received By: D. [illegible]	11-7-00/0930
Relinquished By		Received By	
Relinquished By		Received By	

SPECIAL INSTRUCTIONS

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11/1/00.
Collector not available to relinquish samples on 11/6/00 for shipment. RT 11/6/00

Matrix *: S=Soil, SE=Sediment, SO=Solid, S=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B00-068-84	Page 1 of 1
Collector [illegible]	Company Contact: D Weekes	Telephone No.: 372-9524	Project Coordinator: TRENT, SJ	Price Code: 8L
Project Designation: 200 Area Groundwater Well Drilling Waste Designation for	Sampling Location: 200 West		SAF No.: B00-068	Air Quality ☐
Ice Chest No.: ERC 99-0164 (1 of 1)	Field Logbook No.: EL 15116	COA: JRCRA03200	Method of Shipment: Fed-EX	Data Turnaround: 21 Days
Shipped To: ~~TMA~~/RECRA TMD 11-1-00	Offsite Property No.: A010005		Bill of Lading/Air Bill No.: 42357953 0327	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	Cool 4C	Cool 4C	None	None	None					
	Type of Container	aG	aG	aG	aG	aG					
	No. of Container(s)	1	1	1	1	1					
Special Handling and/or Storage	Volume	250mL	250mL	250mL	250mL	250mL					
SAMPLE ANALYSIS		Semi-VOA - 8270A (TCL), Semi-VOA – 8270A (Add-On) (m-Cresol)	VOA - 8260A (TCL)	IC Anions - 300.0 (Nitrate), Sulfides - 9030; Total Cyanide - 9010	ICP Metals - 6010A (Supertrace), Mercury - 7471 - (CV)	pH (Soil) - 9045	TIE TO:				
Sample No.	Matrix *	Sample Date	Sample Time								
B10F89	SOIL	11-01-00	0445	X	X	X	X	X	B0Y	W17	20000-00-01600

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By: [illegible] Date/Time: 11-1-00 1530	Received By: ~~TMD~~ 11-1-00 Date/Time: 1530		S=Soil SE=Sediment SO=Solid S=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other
Relinquished By: Removed from Ref# 2B 3728 Date/Time: 1050 11/6/02	Received By: R Thorel Date/Time: 1050 11/6/00		
Relinquished By: R Thorel Date/Time: 1032 11/6/00	Received By: FED EX Date/Time:		
Relinquished By: Fed Ex 11-7-00/0930 Date/Time:	Received By: [illegible] 11-7-00/0930 Date/Time:		
Relinquished By: Date/Time:	Received By: Date/Time:		
Relinquished By: Date/Time:	Received By: Date/Time:		

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 11/1/00
Collector not available to relinquish samples on 11/6/00 for shipment..
RT 11/6/00

RT 11/6/00

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Figure 1. Sample Check-in List

Date/Time Received: 11-7-00 / 0930

SDG#: 00111L175

Work Order Number: –   SAF# B00-008

Shipping Container ID: –   Chain of Custody # B00-008-83

1. Custody Seals on shipping container intact? Yes [✓] No [ ]
2. Custody Seals dated and signed? Yes [✓] No [ ]
3. Chain-of-Custody record present? Yes [✓] No [ ]
4. Cooler temperature 2.0°C
5. Vermiculite/packing materials is Wet [ ] Dry [✓]
6. Number of samples in shipping container: 10
7. Sample holding times exceeded? Yes [ ] No [✓]

8. Samples have:
   - ✓ tape
   - ___ hazard labels
   - ___ custody seals
   - ✓ appropriate sample labels

9. Samples are:
   - ✓ in good condition
   - ___ leaking
   - ✓ broken #002 Semi-VOA
   - ___ have air bubbles

10. Were any anomalies identified in sample receipt? Yes [ ] No [✓]
11. Description of anomalies (include sample numbers): N/A

Sample Custodian/Laboratory: [signature] / Becca   Date: 11-7-00

Telephoned to: ________ On ________ By ________

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ERC Radiological Counting Facility Analysis Report

RCF Number RCF5666

Sample Date & Time 11/1/00 0945

Project ID: 200 AREA G/W **SAF Number:** B00-068 **Date Analyzed** 11/6/00 7:47:3

Sample ID: B0YW17

Gamma Energy Analysis

Nuclide		Activity (pCi/g)	Error (pCi/g)	MDC (pCi/g)
Co-60	<	1.8E-01		1.8E-01
Cs-137	<	1.7E-01		1.7E-01
Eu-152	<	3.7E-01		3.7E-01
Eu-154	<	6.3E-01		6.3E-01
Eu-155	<	3.3E-01		3.3E-01
Tl-208	<	2.3E-01		2.3E-01
Pb-214	<	3.0E-01		3.0E-01
Bi-214	<	1.4E+00		1.4E+00
Ra-226	<	2.1E+00		2.1E+00
Ac-228	<	4.2E-01		4.2E-01
Th-234	<	1.4E+00		1.4E+00
Pa-234	<	2.8E-01		2.8E-01
U-235	<	7.4E-01		7.4E-01
Am-241	<	2.1E-01		2.1E-01

TIE TO B10F74 B10F89

Total GEA (pCi/g) +/-

	Activity (pCi/g)		Error (pCi/g)	Alpha MDC (pCi/g)	Beta MDC (pCi/g)
Gross Alpha**	1.4E+00	+/-	6.7E-01	6.5E-01	
Gross Beta	1.5E+01	+/-	1.5E+00		8.5E+00

Definitions:

All errors reported at 2 standard deviations.
N/R = no result or analysis not requested. <MDC = Less than detection limit.
All GEA results reported as "<" list the Minimum Detectable Concentration (MDC) value for that radionuclide.
Rounding error may result in the reported total GEA activity differing from the sum of the > MDC GEA values in the second significant digit.

For soils and natural samples, the following applies:

The analysis of U-235 is based on the activity of Pa-234m.
The analysis of Np-237 is based on the activity of Pa-233.
U-238dau is the activity of Pb-214 and Bi-214, short lived daughter products of U-238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.
Th-232dau is the activity of Ac-228, Pb-212, and Tl-208, short lived daughter products of Th-232. Equilibrium between parent and daughter products may not exist in disturbed materials.
Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.
**The gross alpha results are not corrected for mass absorption
No peaks for this radionuclide were visible above background in the spectrum. The result was reported as less than MDC.

Analyst C. A. Hastings 11/6/00

Report Printed: Monday, November 06, 2000

Report To	Fax
Joan Kessner	372-9487
Joan Kessner	372-9487

ERC Radiological Counting Facility Analysis Report

RCF Number RCI-8665

Sample Date & Time 11/1/00 1040

Project ID: 200 AREA G/W SAF Number: B00-068 Date Analyzed 11/6/00 7:15:3

Sample ID: B0YW16

Gamma Energy Analysis

Nuclide		Activity (pCi/g)	Error (pCi/g)	MDC (pCi/g)
Co-60	<	3.9E-01		3.9E-01
Cs-137	<	4.9E-01		4.9E-01
Eu-152	<	1.0E+00		1.0E+00
Eu-154	<	1.3E+00		1.3E+00
Eu-155	<	1.0E+00		1.0E+00
Bi-214	<	3.2E+00		3.2E+00
Ra-226	<	7.2E+00		7.2E+00
Ac-228	<	1.3E+00		1.3E+00
Pa-234	<	5.5E-01		5.5E-01
Th-234	<	4.3E+00		4.3E+00
U-235	<	1.5E+00		1.5E+00
Am-241	<	5.2E-01		5.2E-01

TIE TO
~~B10F72~~
B10F88

Total GEA (pCi/g) +/-

	Activity (pCi/g)		Error (pCi/g)	Alpha MDC (pCi/g)	Beta MDC (pCi/g)
Gross Alpha**	1.6E+00	+/-	6.9E-01	7.1E-01	
Gross Beta	1.8E+01	+/-	1.6E+00		1.0E+01

Definitions:

All errors reported at 2 standard deviations.
N/R = no result or analysis not requested. <MDC = Less than detection limit.
All GEA results reported as "<" list the Minimum Detectable Concentration (MDC) value for that radionuclide.
Rounding error may result in the reported total GEA activity differing from the sum of the > MDC GEA values in the second significant digit.

For soils and natural samples, the following applies:

The analysis of U-238 is based on the activity of Pa-234m.
The analysis of Np-237 is based on the activity of Pa-233.
U-238dau is the activity of Pb-214 and Bi-214, short lived daughter products of U-238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.
Th-232dau is the activity of Ac-228, Pb-212, and Tl-208, short lived daughter products of Th-232. Equilibrium between parent and daughter products may not exist in disturbed materials.
Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.
**The gross alpha results are not corrected for mass absorption
No peaks for this radionuclide were visible above background in the spectrum. The result was reported as less than MDC.

Analyst G. L. Ritchey 11/6/00

Report To	Fax
Jean Kessner	372-9487
Jean Kessner	372-9487

Report Printed: Monday, November 06, 2000